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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/789,660	02/27/2004	Shing-Chyang Pan	67,200-1226	7563

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EXAMINER
ARANCIBIA, MAUREEN GRAMAGLIA

ART UNIT	PAPER NUMBER
1763	

DATE MAILED: 02/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/789,660	PAN ET AL.	
	Examiner	Art Unit	
	Maureen G. Arancibia	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 January 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) _____ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 February 2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election with traverse of the invention of Group I, Claims 1-8 in the reply filed on 01/03/2005 is acknowledged.

2. The traversal is on the ground(s) that the process as claimed in Group II can only be performed by the claimed apparatus of Group I.

3. This is not found persuasive because the inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the process as claimed could be practiced by another materially different apparatus, such as one that generates plasma with microwaves.

4. Moreover, because these inventions are distinct for the reasons given above and the search required for Group II is not required for Group I, restriction for examination purposes as indicated is proper.

5. The requirement is still deemed proper and is therefore made FINAL.

6. Claims 9-20 withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 01/03/2005. The Examiner notes that Applicant cancelled Claims 9-20 in the amendment filed the same day.

Drawings

7. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference characters "1", "2", "4", "5", and "6" have been used to designate both apparatus elements in Figure 2 and process steps in Figure 3. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

8. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: 114 in Figure 1. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the

examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

10. Claims 1-8 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 6,310,755 to Kholodenko et al.

In regards to Claim 1, Kholodenko et al. teaches a plasma processing apparatus (Figure 1), comprising a chamber 25 with an interior (Figure 1); a wafer heating apparatus 55 that comprises a heater 235 (Column 9, Lines 54-55) and supports a wafer 30; and a source RF power supply (upper right hand corner of Figure 1; Column 4, Lines 5-11).

Note that the preamble recitation of intended use of the claimed apparatus as a pre-clean chamber for pre-cleaning a surface prior to metallization of the surface has been considered, but does not have patentable weight. See MPEP § 2111.02. The apparatus taught by Kholodenko et al. would be capable of performing such a pre-cleaning process.

In regards to Claim 2, the apparatus taught by Kholodenko et al. further comprises a temperature controller 275.

In regards to Claim 3, the apparatus taught by Kholodenko et al. further comprises a bias RF power supply 145 (Column 4, Lines 41-45) connected to the wafer heating apparatus. (Figure 1)

In regards to Claim 4, see the discussion of Claim 2.

In regards to Claim 5, the wafer heating apparatus 55 taught by Kholodenko et al. is an electrostatic chuck (Column 4, Line 12), and is employed at high temperatures of up to 500 degrees C (Column 10, Lines 54-58). Note that the recitation of a "high-temperature electrostatic chuck" in Claim 5 has been interpreted in light of the Specification, which indicates that the chuck is to be used in temperatures greater than 200 degrees C. (Paragraph 12)

In regards to Claim 6, see the discussion of Claim 2.

In regards to Claim 7, see the discussion of Claim 3.

In regards to Claim 8, see the discussion of Claim 2.

11. Claims 1-4 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent 6,634,177 to Lin et al.

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in

the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

In regards to Claim 1, Lin et al. teaches a plasma processing apparatus (Figure 3), comprising a chamber 20 with an interior (Figure 3); a wafer heating apparatus 28 that comprises a heat exchanger 62,64 and heated heat exchanging medium (Column 7, Lines 20-22 and 30-32) and supports a wafer 14; and a source RF power supply 22.

Note that the preamble recitation of intended use of the claimed apparatus as a pre-clean chamber for pre-cleaning a surface prior to metallization of the surface has been considered, but does not have patentable weight. See MPEP § 2111.02. The apparatus taught by Lin et al. would be capable of performing such a pre-cleaning process.

In regards to Claim 2, Lin et al. also teaches a temperature controller 66 (Column 7, Lines 22-30).

In regards to Claim 3, Lin et al. also teaches a bias RF power supply 24 connected to the wafer heating apparatus (Figure 3).

In regards to Claim 4, see the discussion of Claim 2.

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

13. Claims 5-8 rejected under 35 U.S.C. 103(a) as being obvious over Lin et al. in view of Kholodenko et al.

The applied reference of Lin et al. has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). For applications filed on or after November 29, 1999, this rejection might also be overcome by showing that the subject matter of the reference and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person. See MPEP § 706.02(l)(1) and § 706.02(l)(2).

The teachings of Lin et al. were discussed above.

In regards to Claim 5, Lin et al. teaches that the wafer heating apparatus 28 is an electrostatic chuck. (Column 7, Lines 15-16).

Lin et al. does not expressly disclose that the electrostatic chuck can be a high-temperature electrostatic chuck.

Kholodenko et al. teaches an electrostatic chuck 55 (Column 4, Line 12) that is employed at high temperatures of up to 500 degrees C (Column 10, Lines 54-58). Note that the recitation of a "high-temperature electrostatic chuck" in Claim 5 has been interpreted in light of the Specification, which indicates that the chuck is to be used in temperatures greater than 200 degrees C. (Paragraph 12)

It would have been obvious to one of ordinary skill in the art to use an electrostatic chuck that could withstand high temperatures, as taught by Kholodenko et al., in the apparatus taught by Lin et al. The motivation for doing so, as taught by Kholodenko et al. (Column 18, Lines 1-4), would have been to use a chuck that could rapidly heat the substrate without fracturing or microcracking from thermal expansion stress.

In regards to Claim 6, see the discussion above of Claim 2.

In regards to Claim 7, see the discussion above of Claim 3.

In regards to Claim 8, see the discussion above of Claim 2.

14. Claims 1-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,602,793 to Masterson in view of Kholodenko et al.

In regards to Claim 1, Masterson teaches a plasma pre-clean apparatus (Figure 5), comprising a chamber 500 with an interior (Figure 5); a pedestal 508 supporting a wafer W; and a source RF power supply engaging the chamber (Column 5, Lines 1-3).

Masterson does not expressly teach that the wafer can be supported by a wafer heating apparatus.

Kholodenko et al. teaches a plasma processing apparatus (Figure 1), comprising a wafer heating apparatus 55 that includes a heater 235 (Column 9, Lines 54-55) and supports a wafer 30.

It would have been obvious to one of ordinary skill in the art to modify the apparatus taught by Masterson to use a wafer heating apparatus to support the substrate. The motivation for doing so, as taught by Kholodenko et al. (Column 10, Lines 38-44), would have been to maintain the wafer at a temperature suitable for processing.

In regards to Claim 2, the combination of Masterson and Kholodenko et al. as applied to Claim 1 does not expressly teach a temperature controller.

However, Kholodenko et al. further teaches a temperature controller 275.

It would have been obvious to one of ordinary skill in the art to further modify the combination of Masterson and Kholodenko et al. as applied to Claim 1 to include a temperature controller. The motivation for doing so, as taught by Kholodenko et al. (Column 10, Lines 49-54), would have been to allow the wafer heating apparatus to be controlled to maintain the substrate within a narrow temperature range.

In regards to Claim 3, Masterson teaches there should be a bias RF power supply connected to the wafer support. (Column 4, Lines 39-42)

In regards to Claim 4, see the discussion of Claim 2.

In regards to Claim 5, the combination of Masterson and Kholodenko discussed in regards to Claim 1 meets all of the limitations of Claim 5, except that the wafer heating apparatus should be a high-temperature electrostatic chuck.

However, Kholodenko et al. further teaches that the wafer heating apparatus 55 is an electrostatic chuck (Column 4, Line 12), and is employed at high temperatures of up to 500 degrees C (Column 10, Lines 54-58). Note that the recitation of a "high-temperature electrostatic chuck" in Claim 5 has been interpreted in light of the Specification, which indicates that the chuck is to be used in temperatures greater than 200 degrees C. (Paragraph 12)

It would have been obvious to one of ordinary skill in the art to further modify the combination of Masterson and Kholodenko discussed in regards to Claim 1 to make the wafer heating apparatus be a high-temperature electrostatic chuck. The motivation for doing so, as taught by Kholodenko et al. (Column 18, Lines 1-4), would have been to use a wafer heating apparatus that could rapidly heat the substrate without fracturing or microcracking from thermal expansion stress.

In regards to Claim 6, see the discussion of Claim 2.

In regards to Claim 7, see the discussion of Claim 3.

In regards to Claim 8, see the discussion of Claim 2.

Double Patenting

15. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA

1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

16. Claims 1-8 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over Claims 2 and 3 of U.S. Patent No. 6,634,177 ('177) in view of U.S. Patent 6,310,755 to Kholodenko et al.

In regards to Claim 1 of the instant application, Claim 3 of '177 recites a wafer heating apparatus for supporting a wafer, comprising a platform (Line 3 of Claim 1, on which Claim 3 depends), a heat exchanger (Line 4 of Claim 1), and a heated heat exchange medium (Claim 3).

Claim 3 of '177 does not expressly recite that said heating apparatus is part of a processing chamber further comprising a chamber and a source RF power supply.

Kholodenko et al. teaches that a heating apparatus 55 can be used in a plasma processing apparatus (Figure 1), comprising a chamber 25 with an interior (Figure 1) and a source RF power supply (upper right hand corner of Figure 1; Column 4, Lines 5-11).

It would have been obvious to one of ordinary skill in the art to use the wafer heating apparatus recited in Claim 3 of '177 in the plasma processing apparatus taught by Kholodenko et al. The motivation for doing so would have been to perform plasma processing on the wafer supported by the wafer heating apparatus.

Note that the preamble recitation of intended use of the claimed apparatus as a pre-clean chamber for pre-cleaning a surface prior to metallization of the surface has been considered, but does not have patentable weight. See MPEP § 2111.02. The apparatus taught by the combination of Claim 3 of '177 and Kholodenko et al. would be capable of performing such a pre-cleaning process.

In regards to Claim 2 of the instant application, Claim 3 of '177 recites a temperature controller (Line 9 of Claim 1).

In regards to Claim 3 of the instant application, Claim 3 of '177 as modified by Kholodenko et al. does not expressly recite a bias RF power supply connected to the wafer heating apparatus.

However, the apparatus taught by Kholodenko et al. further comprises a bias RF power supply 145 (Column 4, Lines 41-45) connected to the wafer heating apparatus. (Figure 1)

It would have been obvious to one of ordinary skill in the art to further modify the combination of Claim 3 of '177 and Kholodenko et al. as applied to Claim 1 to include a bias RF power supply connected to the wafer heating apparatus. The motivation for doing so, as taught by Kholodenko et al. (Column 4, Lines 42-45), would have been to accelerate the plasma species towards the wafer supported by the wafer heating apparatus.

In regards to Claim 4, see the discussion of Claim 2.

In regards to Claim 5, see the discussion of Claim 1. Claim 2 of '177 further recites that the platform is an electrostatic chuck.

Claim 2 of '177 does not expressly recite that the electrostatic chuck can be a high-temperature electrostatic chuck.

Kholodenko et al. teaches an electrostatic chuck 55 (Column 4, Line 12) that is employed at high temperatures of up to 500 degrees C (Column 10, Lines 54-58). Note that the recitation of a "high-temperature electrostatic chuck" in Claim 5 has been interpreted in light of the Specification, which indicates that the chuck is to be used in temperatures greater than 200 degrees C. (Paragraph 12)

It would have been obvious to one of ordinary skill in the art to use an electrostatic chuck that could withstand high temperatures, as taught by Kholodenko et al., in the apparatus taught by the combination of Claims 2 and 3 of '177 and Kholodenko et al. discussed above. The motivation for doing so, as taught by Kholodenko et al. (Column 18, Lines 1-4), would have been to use a chuck that could rapidly heat the substrate without fracturing or microcracking from thermal expansion stress.

In regards to Claim 6, see the discussion of Claim 2.

In regards to Claim 7, see the discussion of Claim 3.

In regards to Claim 8, see the discussion of Claim 2.

Conclusion

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maureen G. Arancibia whose telephone number is (571) 272-1219. The examiner can normally be reached on core hours of 11-5, Monday-Friday.

18. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on (571) 272-1439. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Maureen G. Arancibia

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